

Department of the Interior  
US Geological Survey

# **LANDSAT 7 OPERATIONS AGREEMENT (OA) BETWEEN INTERNATIONAL GROUND STATIONS (IGS) AND LANDSAT 7**

**Revision A**  
**March 2003**



# LANDSAT 7 OPERATIONS AGREEMENT (OA) BETWEEN THE INTERNATIONAL GROUND STATIONS (IGS) AND LANDSAT 7

## March 2003

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## Executive Summary

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The International Ground Stations (IGSs) receive direct X-band downlink data from the Enhanced Thematic Mapper Plus (ETM+) sensor on the Landsat 7 satellite. They interact with the satellite control center to schedule the downlinks and with the USGS archive to submit browse and metadata files. This document specifies and controls the operational interface between International Ground Stations (IGSs) and Landsat 7 operations by clearly defining the activities between the IGS operators and the Landsat 7 operators.

*Keywords: international, station, IGS, schedule, contact, metadata, browse, transfer, priority, mask, IPM*

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## **TBD / TBR / TBS List**

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None identified at this time.



# Section 1 Introduction

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## 1.1 Background

The International Ground Stations (IGSs) receive direct X-band downlink data from the Landsat 7 satellite. They interact with the satellite control center to schedule the downlinks and with the Land Processes Distributed Active Archive Center (LP DAAC) to submit browse and metadata files.

## 1.2 Purpose and Scope

This document specifies and controls the operational interface between International Ground Stations (IGSs) and Landsat 7. Its purpose is to clearly define activities between the IGS operators and the Landsat 7.

This agreement will become effective upon approval and will remain in effect throughout the operations phase of the Landsat 7 mission. Any subsequent changes to this document must be mutually agreed upon by the USGS Mission Management Office (MMO), on behalf of the IGSs, by the LP DAAC, and by the Landsat 7 FOT.

This Operational Agreement (OA) covers the operational interfaces between the MOC personnel and the IGS personnel and between the IGS personnel and the Earth Resources Observation System (EROS) Data Center (EDC) LP DAAC personnel.

## 1.3 Document Organization

This document consists of 5 sections, 4 appendices, and a References list:

- Section 1 identifies the document purpose, scope, references, and organization.
- Section 2 describes the facilities involved in the operational interfaces.
- Section 3 addresses the Operational Responsibilities related to the MOC-IGS interface.
- Section 4 addresses the Operational Responsibilities related to the MMO-IGS interface.
- Section 5 addresses the Operational Responsibilities related to the LP DAAC-IGS interface.
- Appendix A defines the abbreviations and acronyms used in this document.
- Appendix B lists the relevant points of contact within the FOT and the conditions under which each should be used.
- Appendix C lists the relevant points of contact within the MMO and the conditions under which each should be used.
- Appendix D lists the relevant points of contact within the LP DAAC and the conditions under which each should be used.
- References lists documents used to develop this OA or useful for further information.

## **Section 2 Facilities Description**

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### **2.1 The Mission Operations Center (MOC)**

The Landsat 7 MOC, located in Building 32 at Goddard Space Flight Center (GSFC), Greenbelt, Maryland, is operated by the USGS and provides the hardware and software systems necessary for the successful execution of real-time spacecraft operations and off-line scheduling and analysis activities. All command and control functions of the spacecraft take place in the MOC. From the MOC, the Flight Operations Team (FOT) ensures that spacecraft conditions are monitored and controlled. Along with ensuring the health and safety of the spacecraft, the FOT schedules and executes science data capture and retrieval. The FOT, using MOC tools, facilitates resource scheduling and interfaces with the appropriate elements required to conduct mission operations and meet the mission objective.

### **2.2 The Mission Management Office (MMO)**

To carry out its responsibility for Landsat 7 on-orbit operations, the USGS has established the Mission Management Office (MMO) to plan and direct those activities. The MMO acts on behalf of the Landsat Coordinating Group (LCG), which consists of senior agency officials at NASA and USGS who oversee the Landsat Program.

The Landsat 7 MMO is charged with implementation of the Landsat 7 Data Policy. In this capacity, the MMO is responsible for the day-to-day operations of the Landsat 7 System to fulfill that policy. The MMO establishes and maintains agreements with the IGSs for providing direct downlink Landsat 7 ETM+ data, provides for appropriate operational coordination, and acts as a point of contact for non-routine communications with the IGSs. Routine contacts with the IGSs are delegated by the MMO to the Landsat 7 FOT.

### **2.3 The Land Processes Distributed Active Archive Center (LP DAAC)**

The Land Processes Distributed Active Archive Center (LP DAAC) is an element of the Earth Observing System Data and Information System (EOSDIS). It is located in Sioux Falls, South Dakota, at the EROS Data Center (EDC). For Landsat 7, the LP DAAC archives and distributes Landsat 7 Level 0R data, metadata, and browse data. The LP DAAC supports user queries and distributes data to users. It maintains an on-line library of IGS metadata and browse data for Landsat 7. The IGSs send metadata and (optionally) browse data to the LP DAAC for inclusion in this library. The LP DAAC also maintains a library of calibration parameters and mission information for Landsat 7.

### **2.4 The International Ground Stations (IGSs)**

In addition to downlinking X-band image data to US facilities, the Landsat 7 spacecraft also downlinks image data to the IGSs. These stations receive real-time image data only as acquired within their acquisition circle. Each IGS signs a Memorandum of Understanding (MOU - Reference Document 2) with the USGS which specifies certain terms of agreement relating to the scheduling and operations affecting their access to image data downlinks. A list of possible IGSs is shown in Table 2-1.

## 2.5 The Transportable IGSs

In addition to downlinking X-band image data to US facilities and the IGSs, the Landsat 7 spacecraft also downlinks image data to Transportable IGSs when required. Transportable IGSs are ground stations that change locations. Each Transportable IGS signs an MOU with the USGS which specifies certain terms of agreement relating to the scheduling and operations affecting their access to image data downlinks. Similar to IGSs, the Transportable IGSs receive real-time image data only, as acquired within their acquisition circle. From this point in this document, any reference to IGS includes the Transportable IGSs.

SYMBOL	LOCATION	COMMENT ON STATION STATUS
COA	Argentina, Cordoba	
ASA	Australia, Alice Springs	
HOA	Australia, Hobart	
CUB	Brazil, Cuiaba	
GNC	Canada, Gatineau	
PAC	Canada, Prince Albert	
CPE	Ecuador, Cotopaxi	Not currently active
AWE	Egypt, Aswan	Not currently active
LBG	Gabon, Libreville	Not currently active
NSG	Germany, Neustrelitz	
UHI	Hawaii, University of	Not currently active
DKI	Indonesia, Parepare	
FUI	Italy, Fucino	Not currently active; replaced by MTI
MTI	Italy, Matera	
HAJ	Japan, Hatoyama	
HIJ	Japan, Hiroshima	
KUJ	Japan, Kumomoto	
SEK	Korea, Seoul	Not currently active
KLM	Malaysia, Kuala Lumpur	Not currently active
ULM	Mongolia, Ulaanbaatar	No currently active (campaign only)
ISP	Pakistan, Islamabad	Not currently active
BJC	Peoples Republic of China, Beijing	
UPR	Puerto Rico, University of	
RSA	Saudi Arabia, Riyadh	Not currently active
SGP	Singapore	Not currently active
JSA	South Africa, Johannesburg	
MPS	Spain, Maspalomas	
KIS	Sweden, Kiruna	
TFT	Taipei, China, Chung-li	
TMT	Taipei, China, Chung-li	
BKT	Thailand, Bangkok	

**Table 2-1: Current and Potential IGS List.**

## Section 3 Operational Responsibilities - MOC

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### 3.1 Products

During on-orbit operations, the IGSs request image acquisition via Service Requests sent to the Landsat 7 open file server located in the MOC, either by ftp or by using the IGS Priority & Service Request Map Editor (IPM) online tool. As part of the new station start-up procedure, a unique user ID and password are assigned to each IGS to access the MOC open server and the IPM. The Service requests from the IGSs are ingested by the MOC Scheduling system and incorporated into the Scheduler acquisition request database. These requests are honored as system resources allow. Conflicts are resolved in a manner agreed to by the MMO and the IGSs (see Section 4.7). The Landsat 7 spacecraft's ETM+ sensor is duty cycle limited by thermal and power constraints which could also preclude the honoring of IGS imaging requests.

Several products are exchanged between the IGSs and the FOT in the MOC. Table 3-1 lists the product descriptions, timespans, and delivery frequency

Product Name	From/ To	Product Description	Product Timespan	Delivery Frequency
STATION DESCRIPTION	IGSs to FOT	Provides FOT with information about ground station location and points of contact	Not Applicable (N/A)	Once before station startup, as baseline; updates as required, at least 7 days prior to effective date
RECEIVE ANTENNA HORIZON MASK	IGSs to FOT	Provides minimum elevation angles for unobstructed line of sight to satellite	N/A	Once before station startup, as baseline; updates as required, at least 7 days prior to effective date
SERVICE REQUEST	IGSs to FOT	Requests FOT to schedule transmission to ground station	Up to 10 imaging intervals	At least 36 hours prior to start of requested acquisition(s)
CONTACT SCHEDULE	FOT to IGSs	Notifies the station of scheduled X-band on/off times	37 hours nominally	After every scheduling run that included a request from that ground station

**Table 3-1: Product Descriptions - MOC / IGS. (1 of 3)**

<b>Product Name</b>	<b>From/ To</b>	<b>Product Description</b>	<b>Product Timespan</b>	<b>Delivery Frequency</b>
ACQUIRED SCENES REPORT	FOT to IGSs	Notifies the station of the details of each scene scheduled for downlink in the corresponding contact schedule	37 hours nominally	Daily
DEFINITIVE EPHEMERIS REPORT	FOT to IGSs	Provides a definitive ephemeris point for every minute	61 hours nominally	Daily
PRIORITY MASK (PRI file)	IGSs to FOT	Defines a priority (1/2/3) for each scene within the IGS's acquisition circle	Can be from 1 to 23 cycles	Once before station startup, as baseline; updates as required, at least 2 days prior to effective date
PRIORITY / SERVICE REQUEST MASK (PSR file)	IGSs to FOT	For scenes within IGS acquisition circle, either defines a priority or makes an acquisition request	Can be from 1 to 23 cycles	Priorities: once before station startup, as baseline, with updates as required at least 2 days prior to effective date Requests: as required, at least 2 days prior to effective date
<ul style="list-style-type: none"> <li>• IIRV</li> <li>• BME, NORAD</li> </ul>	FOT to IGSs	<ul style="list-style-type: none"> <li>• LS7 position and velocity vectors</li> <li>• LS7 orbital elements</li> </ul> Both types are for ground station use in pointing to LS7	<ul style="list-style-type: none"> <li>• 96 hours or 120 hours nominally</li> <li>• Single vector</li> </ul>	<ul style="list-style-type: none"> <li>• Mondays (96 hrs), Wednesdays (96 hrs), and Fridays (120 hrs)</li> <li>• Daily</li> </ul>
PROBLEM REPORT	IGSs to FOT	Used to report potential satellite related problems during downlink receipt	N/A	Within 24 hours of detection of problem

**Table 3-1: Product Descriptions - MOC / IGS. (2 of 3)**

<b>Product Name</b>	<b>From/ To</b>	<b>Product Description</b>	<b>Product Timespan</b>	<b>Delivery Frequency</b>
ADMINISTRATIVE MESSAGE	IGSs to FOT, FOT to IGSs	Free form information not covered by other messages/files	N/A	As needed
FORMATS Product Report	FOT to IGSs	Acknowledgment of receipt and ingest of IGS inbound files, and validation of service requests	N/A	Within 5 minutes of product receipt
MANUAL PRIORITY / REQUEST SUBMISSION REPORT	FOT to IGSs	Acknowledgment of receipt and ingest of PRI and PSR files; includes results of content validation	N/A	Within 5 minutes of product receipt
IPM LOG	FOT to IGSs	Record of activities during IPM online sessions	Appended to existing file; new file created as needed	Updated in real-time
CALIBRATION PARAMETER FILE	FOT to IGSs	Provides geometric and radiometric parameters for image processing	90 days nominally	Once before launch, updates nominally every 90 days

***Table 3-1: Product Descriptions - MOC / IGS. (3 of 3)***

### **3.2 Use of Administrative Messages**

The Administrative Message is utilized by both the MOC and IGSs to notify each other of anomalous conditions and to pass information not covered by other message types. The following list outlines the major reasons for which the MOC might send an Administrative Message:

- Delay in Contact Schedule file updates
- Notice of Calibration Parameters File update
- Notice of system and spacecraft status

The MOC notifies each IGS of a spacecraft contingency, spacecraft emergency, or planned maneuvers that affect imaging, using the Administrative Message. It is the responsibility of each IGS to poll the MOC server every day to ensure timely notification of possible non-imaging periods. For time critical messages, an e-mail version of the Administrative Message is sent to each IGS in addition to the message placed on the server. This may also be followed by a phone call to the station contact person. The e-mail address and phone number to be used is specified in the Station Description Message.

### 3.3 Retrieval of Files From the MOC

Files to be sent to the IGSs are placed on the MOC open server in the appropriate IGS output directory. It is the responsibility of each IGS to log onto the Landsat 7 file server daily and retrieve any files generated for the station, especially those related to scheduled acquisitions: the Contact Schedule, Acquired Scenes Report, and IIRV/BME/NORAD files.

It is recommended that each IGS poll its directory on the MOC open server each day before the first contact with the satellite to ensure these acquisition-related files have not been updated since the last poll.

The FOT nominally places the acquisition-related files on the MOC open server within the same two-hour window each day. The two-hour window opens at 2000Z and closes at 2200Z every day during normal operations.

#### 3.3.1 File Retrieval Instructions

The following are the steps to be followed in retrieving files from the MOC open server:

1. Establish an ftp connection to the host using the Domain name and IP address
2. Once connected, enter your User name and Password
3. Change to the directory specified in section 3.3.2 for your site and the file type you wish to retrieve
4. Use the ftp "get" command to retrieve files from the MOC
5. When you have finished, use the ftp "bye" command to exit from ftp

#### 3.3.2 IP Address and Directory Information

The specific IP address and directory information to retrieve products from the MOC are:

IP Address: (see section 3.6)  
Domain Name: (see section 3.6)  
User Name: **ID** (as listed in Table 3-2)  
Password: (see section 3.6)  
Directory Structure: C:\LS7\ProductRepository\Outbound\Station\**Country**\**ID**\Products

Used for the following files:

Contact Schedule  
Acquired Scenes Report  
Definitive Ephemeris Report  
IIRV, BME, NORAD  
Calibration Parameter File  
Administrative Message from FOT

(see Table 3-2 for **Country** and **ID** values to be used)

Directory Structure: C:\LS7\ProductRepository\Outbound\Station\Country\ID\Reports  
Used for the following files:  
FORMATS Product Report  
Manual Priority/Request Submission Report  
IPM Log  
(see Table 3-2 for **Country** and **ID** values to be used)

<b>Country</b>	<b>ID</b>	<b>id</b>
Argentina	COA	coa
Australia	ASA	asa
Australia	HOA	hoa
Brazil	CUB	cub
Canada	GNC	gnc
Canada	PAC	pac
Ecuador	CPE	cpe
Egypt	AWE	awe
Gabon	LBG	lbg
Germany	NSG	nsg
Indonesia	DKI	dki
Italy	FUI	fui
Italy	MTI	mti
Japan	HAJ	haj
Japan	HIJ	hij
Japan	KUJ	kuj
Korea	SEK	sek
Malaysia	KLM	klm
Mongolia	ULM	ulm
Pakistan	ISP	isp
PeoplesRepublicofChina	BJC	bjc
PuertoRico	UPR	upr
SaudiArabia	RSA	rsa
Singapore	SGP	sgp
SouthAfrica	JSA	jsa
Spain	MPS	mps
Sweden	KIS	kis
TaipeiChina	TFT	tft
TaipeiChina	TMT	tmt
Thailand	BKT	bkt
UniversityofHawaii	UHI	uhi

**Table 3-2: Country and ID Directory Paths**



### **3.4 Sending of Files to the MOC**

Files to be sent to the MOC are transferred to the MOC open server using file transfer protocol (ftp) and are placed in the appropriate IGS input directory. There are a few timing considerations:

1. The IGS Service Request message must be received by the MOC no later than 36 hours before the requested image acquisition start time(s).
2. The MOC requires 7 days to incorporate Station Description changes.

The MOC software generates a FORMATS Product Report or a Manual Priority/Request Mask Submission Report within 5 minutes of receipt of a file from an IGS. Each report acknowledges receipt and successful transfer of the IGS file into the MOC. The FORMATS report also reports on results of validating Service Request messages. If the service request message fails validation, appropriate warnings and/or errors are reported. Each warning/error contains a statement in brackets which begins with "message." A portion of a sample report is found in Figure 3-1. Table 3-3 includes some of these error statements and describes the appropriate actions to be taken by the IGS. The Manual Priority/Request Mask Submission Report also reports on results of validating the PSR file. If the mask fails validation, appropriate warnings and/or errors are reported. A sample report of a failed validation is shown in Figure 3-2 and a sample report of a successful validation is shown in Figure 3-3. The IPM tutorial Part E (Reference Document 3) describes the appropriate actions to be taken by the IGS for errors reported in the Manual Priority/Request Mask Submission Report.

FORMATS Product Report	
L71998111PACREQ.S01xRPT	
Date Generated: 1998:111:16:50:27	
Product:	309_SVCREQ
Incoming File:	L71998111PACREQ.S01
Message	Message
Type	
INFO	L71998111PACREQ.S01 received by Transform.
WARN	[messages.wrongScIdLbl1] (template line 96 input file line 14 offset 398): We were hoping to see next the <S/C> part of the spacecraft ID label, but instead we read <TYP>.
WARN	[messages.wrongScIdLbl2] (template line 102 input file line 14 offset 400): We expected here to see <ID:> part of the spacecraft ID label, but instead we read the characters <E:>.
WARN	[messages.wrongScId] (template line 108 input file line 14 offset 422): We expected here to see <7> as the spacecraft id value but instead we saw <R>.
WARN	[messages.startPathLabel1Check] (template line 113 input file line 14 offset 424): Text ( messages.startPathLabel1:EQ,EQI, 'START') failed;
WARN	[messages.startPathLabel2Check] (template line 115 input file line 16 offset 431): Text ( messages.startPathLabel2:'S/C',EQI, 'PATH:') failed;
ERROR	[messages.startPathRangeCheck] (template line 117 input file line 16 offset 435): Numeric ( messages.startPath:'ID:',GE,1) failed, AND, Numeric ( messages.startPath:'ID:',LE,233) failed;
Error count =	27
Warning count =	70
Total Messages =	99

**Figure 3-1: Sample FORMATS Product Report with Warning/Error Messages.**

Reported Warning/Error Statement	Appropriate IGS Action
wrongScIdLbl1 wrongScIdLbl2	make sure the next line after DTG (for the first or only request) or after REQ. TYPE (for subsequent stacked requests) is correctly labeled "S/C ID:"
wrongScId	check that the value for S/C ID is "7"
startPathLabel1Check startPathLabel2Check	make sure the next line after S/C ID is correctly labeled "START PATH:"
startPathRangeCheck	check that the value for START PATH is between 1 and 233, inclusive
startRowLabel1Check startRowLabel2Check	make sure the next line after START PATH is correctly labeled "START ROW:"
startRowRangeCheck	check that the value for START ROW is between 1 and 248, inclusive
stopRowLabel1Check stopRowLabel2Check	make sure the next line after START ROW is correctly labeled "STOP ROW:"

**Table 3-3: FORMATS Product Report - Appropriate IGS Actions for Reported Warnings/Errors. (1 of 2)**

<b>Reported Warning/Error Statement</b>	<b>Appropriate IGS Action</b>
stopRowRangeCheck	check that the value for STOP ROW is between 1 and 248, inclusive; if the range spans row 248 to row 1 (e.g. 246 thru 10), you must enter two requests: one for the range up through 248 and the other beginning at row 1 (e.g. 246 thru 248 and 1 thru 10)
startRowExceedsStopRow	check that the value for START ROW is less than the value for STOP ROW
effectiveDateLabel1Check effectiveDateLabel2Check	make sure the next line after STOP ROW is correctly labeled "EFFECTIVE DATE:"
effectDateFormatCheck	ensure the value for EFFECTIVE DATE is in the format yyyy-mm-dd; where yyyy is the year (1997 - 2100), mm is the month (01 - 12), and dd is the day (01 - 31)
expirationDateLabel1Check expirationDateLabel2Check	make sure the next line after EFFECTIVE DATE is correctly labeled "EXPIRATION DATE:"
expirDateFormatCheck	ensure the value for EXPIRATION DATE is in the format yyyy-mm-dd; where yyyy is the year (1997 - 2100), mm is the month (01 - 12), and dd is the day (01 - 31)
acqRateLabel1Check acqRateLabel2Check	make sure the next line after EXPIRATION DATE is correctly labeled "ACQ. RATE:"
acqRateRangeCheck	check that the value for ACQ. RATE is either "0" or "1"
minimumGapLabel1Check minimumGapLabel2Check	make sure the next line after ACQ. RATE is correctly labeled "MINIMUM GAP:"
minimumGapRangeCheck	check that the value for MINIMUM GAP is between 0 and 366, inclusive; note that the instrument limit is 85 for daytime scenes and that a value of 90 signals the scheduler software that a night scene is being requested and sun angle should be ignored
maxSolarZenithLbl1Check maxSolarZenithLbl2Check maxSolarZenithLbl3Check maxSolarZenithLbl4Check	make sure the next line after MINIMUM GAP: is correctly labeled "MAX. SOLAR ZENITH ANGLE:"
getMaxSolarZenithAngle.maxSolarZenithRangeCheck	check that the value for MAX. SOLAR ZENITH ANGLE is between 0 and 90
reqTypeLabel1Check reqTypeLabel2Check	make sure the next line after MAX. SOLAR ZENITH ANGLE: is correctly labeled "REQ. TYPE:"
wrongReqTypeSize	ensure the entry for REQ. TYPE is 3 characters
rqstTypeWrong	make sure the entry for REQ. TYPE matches the 3 letter IGS name found in the file name

**Table 3-3: FORMATS Product Report - Appropriate IGS Actions for Reported Warnings/Errors. (2 of 2)**

Manual Priority/Request Mask Submission Report

Station gnc  
Priorities  
Effective Cycle 1  
Expiration Cycle 1  
Start Path 18  
Start Row 41

2002-07-19 10:04:55.952

The map priorities failed validation due to:  
path 4 row 42: Land priority assigned to water scene.

Manual Priority/Request Mask Submission Report

Station gnc  
Requests  
Effective Cycle 1  
Expiration Cycle 1  
Start Path 18  
Start Row 41

2002-09-16 16:30:52.835

The map requests failed validation due to:  
path 18 row 46: Request for scene with no priority.  
path 18 row 47: Request for scene with no priority.

**Figure 3-2 Sample Manual Priority/Request Mask Submission Failure Reports.**

Manual Priority/Request Mask Submission Report

Station gnc  
Priorities  
Effective Cycle 1  
Expiration Cycle 1  
Start Path 18  
Start Row 41

2002-09-16 16:22:04.615

The map priorities passed validation.

Manual Priority/Request Mask Submission Report

Station gnc  
Requests  
Effective Cycle 1  
Expiration Cycle 1  
Start Path 18  
Start Row 41

2002-09-16 16:22:06.408

The map requests passed validation.

***Figure 3-3 Sample Manual Priority/Request Mask Submission Success Reports.***

### **3.4.1 File Transfer Instructions**

The following are the steps to be followed in sending files to the MOC open server:

1. Establish an ftp connection to the host using Domain name and IP address
2. Once connected, enter your User name and Password
3. Change to the directory specified in section 3.4.2 for your site
4. Use the ftp "put" command to transfer files to the MOC
5. When you have finished, use the ftp "bye" command to exit from ftp

### 3.4.2 IP Address and Directory Information

The specific IP address and directory information to transmit products to the MOC are:

IP Address: (see section 3.6)  
Domain Name: (see section 3.6)  
User Name: **ID** (as listed in Table 3-2)  
Password: (see section 3.6)  
Directory Structure: C:\LS7\ProductRepository\Inbound\Station\**Country**\ID\Products

Used for the following files:

Station Description  
Receive Antenna Horizon Mask  
Service Request  
Priority Mask (PRI)  
Priority/Service Request Mask (PSR)  
Problem Report  
Administrative Message from IGS

(see Table 3-2 for **Country** and **ID** values to be used)

### 3.5 Using the IGS Priority & Service Request Map Editor (IPM) Online Tool

The IGSs have the option of submitting priority masks and service requests as a flat file using the interface outlined in section 3.4, or using the online IGS Priority & Service Request Map Editor (IPM) online tool to submit the same information over the Internet. Each station is assigned an account name and password allowing access to the IPM tool and updating of the masks for which the station is responsible.

#### 3.5.1 Instructions For IPM Tool Use

1. Go to the URL and enter User Name and Password.
2. Select the station on which you want to work.
3. Select the cycle or season on which you want to work.
4. Select whether you want to work on Priorities, Requests, or both (both is not recommended).
5. Edit the map as you wish.
6. Use the VALIDATE option to check the validity of your entries against the constraints.  
For priorities, these include
  - a. the number of priority 1 scenes allowed each cycle day,
  - b. the combined number of priority 1 and 2 scenes allowed each cycle,
  - c. the number of paths each day on which priority 1 scenes are allowed,
  - d. whether the priority 1 scenes must be contiguous within a path, or not.For requests, these include whether there are already priorities assigned for the scenes requested.
7. When you have completed work on a map and are ready to finalize it, use the SUBMIT option to send the completed, validated map to the MOC for ingest.
8. A message is displayed showing the success or failure of the submit.

Online help pages are easily accessed as well as reference tools such as a list of dates within each cycle. Detailed instructions are given in the IPM Tutorial (Reference Document 3).

### 3.5.2 Access Information

The access information for the IPM online tool is:

URL: (see section 3.6)  
User Name: **IC Name** (as listed in Table 3-4)  
Password: (see section 3.6)

IC Name	Stations Which Can Be Accessed
Argentina	COA
Australia	ASA HOA
Brazil	CUB
Canada	GNC PAC
Ecuador	CPE
Egypt	AWE
ESA	FUI KIS MPS MTI NSG
Gabon	LBG
HatoyamaJapan	HAJ KUJ
HiroshimaJapan	HIJ
Indonesia	DKI
Korea	SEK
Malaysia	KLM
Mongolia	ULM
Pakistan	ISP
PeoplesRepublicofChina	BJC
SaudiArabia	RSA
Singapore	SGP
SouthAfrica	JSA
TaipeiChina	TFT TMT
Thailand	BKT
UniversityofHawaii	UHI
UniversityofPuertoRico	UPR

**Table 3-4 User Names for Access to IPM Tool.**

### 3.6 Handling of Sensitive Data

Sensitive data related to the interface between the MOC and the IGSs are the user account password, domain name, IP address, and IPM URL. Each station, after signing on to become a Landsat 7 IGS, is sent a private attachment containing the sensitive data items required by the IGS to access the MOC open server and the IPM online tool. The sensitive data is sent via a postal service and will not be sent electronically. The address provided by the IGSs in the Station Description Message is used.

Passwords are required to be updated once each year; new passwords will be sent via postal service or via telephone.

## 3.7 ftp Examples

### 3.7.1 Typical "put" ftp Session with the MOC

```
>ftp <Enter Domain name here>  
Username: <Enter User name here>  
Password: <Enter Password here>  
>cd /LS7/ProductRepository/Inbound/Station/<country name>/<3-letter station ID>/Products  
>put <Filename>  
... once transfer is complete ...  
>bye
```

### 3.7.2 Typical "get" ftp Session with the MOC

```
>ftp <Enter Domain name here>  
Username: <Enter Username here>  
Password: <Enter Password here>  
>cd /LS7/ProductRepository/Outbound/Station/<country name>/<3-letter station ID>/Products  
>get <Filename>  
... once transfer is complete ...  
>bye
```

## 3.8 MOC Transfer Problem Resolution

There are several steps that can be taken if you are having problems:

1. Contact your local system administrator if you have any questions about your workstation/PC.
2. Initiate your ftp session with the MOC. If you can connect to the MOC, but cannot access the correct directory or cannot "put" or "get" files, contact the Landsat 7 FOT using the phone numbers in Appendix B.

## 3.9 Backup-MOC (bMOC) Operations

A backup-MOC (bMOC) has been established at a location distant from Goddard Space Flight Center. In the event of an emergency requiring evacuation of the MOC, or a catastrophic equipment failure at the MOC, operations will be transferred to the bMOC. The IGSs will be notified by email and Administrative messages. The notification will include the new Domain name and IP address to be used to access the server at the bMOC. The directory structure, User Names, and Passwords will remain the same.

The database at the MOC is mirrored into the bMOC, so the IGSs should not have to resubmit any files. However, the stations should poll the Outgoing directory at the bMOC to make sure they have the latest products. There may be a slight delay in product deliveries (contact schedules, acquired scenes report, etc.) on the first day of the transition. Depending on the reason for the move to the bMOC, the spacecraft schedule may have changed and updated products may have been posted to the server. The FOT will provide any pertinent updates via Administrative Messages, e-mail, telephone, and/or fax. These updates will include any product delivery delays or issues, as well as the expected duration of operations from the bMOC.



## **Section 4 Operational Responsibilities - MMO Interface**

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### **4.1 Introduction**

The MMO is responsible for overseeing the Landsat 7 on-orbit operations after launch plus 60 days. The MMO is responsible for the day-to-day operations of the overall Landsat 7 system, from spacecraft to ground system, to fulfill the Landsat 7 Data Policy Plan. The MMO, acting on behalf of the Landsat Coordinating Group (LCG), interacts with the IGSs to establish and maintain operational agreement for direct downlink of Landsat 7 ETM+ data. The MMO provides operational coordination and resolves programmatic level issues to ensure the success of the Landsat 7 Mission. The areas of the Landsat 7 to IGS interface in which the MMO has operational responsibilities include:

- Start-up of new stations
- IGS Memorandum of Understanding
- IGS Operations Agreement
- Billing and accounting
- Anomaly resolution
- Schedule conflict resolution, including requests for night and water scenes

These are discussed in more detail in the following sections. The points of contact for the MMO are listed in Appendix C.

### **4.2 Start-up of New Stations**

The MMO provides to each new IGS the information required to implement a Landsat 7 data receiving and processing station. This information includes:

- Radio frequency (RF) interface description, including antenna frequencies and downlink specifications
- data and message formats, including interfaces to the MOC and the LP DAAC
- hardware and software requirements imposed by data format or satellite design
- test data for use in station checkout

When an IGS has signed an MOU with the USGS and is within 3 months of being operational, they are given the information required to access the servers at the MOC and the LP DAAC, and the IPM online tool. This access will enable the exchange of test messages and test data files prior to the station coming on-line for routine operations. An important part of the start-up process is the submission of the Station Description and Receive Antenna Horizon Mask messages by the IGS to the MOC. These messages enable the MOC and the LP DAAC to prepare for both testing and routine operations with the station. Another part of the start-up process is the assignment of acquisition priorities to the scenes within the station circle, preferably via the IPM online tool.

### **4.3 IGS Memorandum of Understanding**

Acting on behalf of the Landsat Coordinating Group (LCG), the MMO negotiates with the IGSs to establish and maintain operational agreements for direct downlink of Landsat 7 ETM+ data. The Memorandum of Understanding (MOU - Reference Document 2) is the formal vehicle for this bilateral agreement between USGS and the IGS, detailing responsibilities for each party and any costs involved. The MMO works with the IGS to resolve any issues related to the MOU between the USGS and the IGS.

### **4.4 IGS Operations Agreement**

The MMO provides operational coordination and resolves programmatic level issues to ensure the success of the Landsat 7 mission. In this role, it acts on behalf of the IGSs in establishing an Operations Agreement (OA) with the three facilities that interface with the IGSs during operations: the MOC, the LP DAAC, and the MMO. The MMO is also the point of contact for non-routine communication with the IGSs. The IGSs are encouraged to first use the routine interface channels identified in the Operations Agreement to resolve any problem. These channels include the Problem Report, the Administrative Message, and direct contact with the FOT or LP DAAC.

### **4.5 Billing and Accounting**

The MMO is responsible for setting up billing and accounting for access fees from the IGSs. Billing and accounting information is provided to the IGSs each quarter.

### **4.6 Anomaly Resolution**

Any anomaly related to the direct downlink of Landsat 7 ETM+ data that cannot be resolved through the routine communications channels is directed to the MMO for resolution.

### **4.7 Schedule Conflict Resolution, Including Night and Water Imaging**

It is possible for conflicts to arise during the scheduling process due to resource constraints. For the most part, these can be dealt with fairly by the Mission Planners using the Scheduling System software. If for some reason a conflict occurs that cannot be resolved by routine procedures, for example due to special IGS data acquisition requirements, the MMO will provide a mutually agreeable resolution in accordance with the MOU and the OA. Any requests for night or water imaging must be sent to the MMO for approval. The MMO will forward approved requests to the Mission Planners for scheduling.

### **4.8 Landsat 7 Ground Station Operators Working Group (LGSOWG)**

The MMO organizes and chairs the LGSOWG in accordance with Section 2.C of the MOU (Reference Document 2). The LGSOWG serves as a forum for exchange of programmatic, management, and technical information among ground station operators and the MMO. The IGSs designate their responsible representatives to participate in the LGSOWG which convenes annually at a location determined by the members.

At the LGSOWG, each IGS representative has an opportunity to provide a Station Status Report. The content of the report includes, but is not limited to, the following:

- Station Information: location, equipment, governing organizations, points of contact.
- Current and Planned Data Acquisition Activities: Landsat 7 and other data the station is collecting or plans to collect.
- Summary of Landsat 7 X-band downlink statistics and quality.
- Statistical Summary of Acquired Landsat 7 Scenes: cloud cover percentages, user request rate and scene refresh rate.
- Summary of the Station's Landsat 7 Data Archive: archive equipment and procedures, total number of scenes archived; percentage of good quality scenes with acceptable cloud cover and percentage of coverage of the IGS nation's landmass per season.
- Landsat 7 Data Distribution Activities: how the system works, order interfaces, equipment, staff, customer information and support, data delivery summary by format and media.

The LGSOWG has authorized the establishment of a subgroup, the Landsat Technical Working Group (LTWG), to address technical issues related to the operation of Landsat ground stations. Each signatory Landsat ground station and USGS as the satellite operating agency provide technically-oriented representatives to the LTWG. The LTWG meets as a group once or twice a year; subcommittees may meet or work on selected topics in-between these plenary sessions. Reports are made to the LGSOWG at the annual meeting. Issues that have been addressed in the past by the LTWG include:

- the Interface Control Document between the ground stations and the satellite operator
- the current satellite status and future plans
- results of calibration studies and data quality analyses
- archive strategies, including restoration of old media
- data and product exchange philosophies and formats
- problems or artifacts encountered during downlinks or during data processing

## Section 5 Operational Responsibilities - LP DAAC Interface

---

### 5.1 Products

The IGSs send metadata to the LP DAAC for all Landsat 7 data they receive and archive. In accordance with the Memorandum of Understanding (MOU), metadata is sent to the LP DAAC on at least a monthly basis. The IGSs must also send browse data to the LP DAAC if they don't have an online browse archive at their facilities. Otherwise, browse delivery is optional.

There are five types of files associated with the transfer protocol between the IGS and the LP DAAC:

- Product delivery record (PDR)
- Metadata product (MTA)
- Browse images (R##)
- Product delivery record discrepancy (PDRD)
- Product acceptance notification (PAN)

The protocol for the electronic transfer of metadata to the DAAC comprises these five files:

- Product Delivery Record (PDR) – accompanies the product from the IGS to the LP DAAC and describes the source, contents, and internal labeling of the metadata and browse products.
- Metadata product (MTA) – A product that contains Format 1 and Format 2 metadata for one Landsat 7 subinterval, and may include reference to accompanying browse images.
- Browse images (R##) – A browse image of each scene described in the metadata product.
- PDR Discrepancy (PDRD) – returned to the IGS from the LP DAAC only if a problem is found while reading the PDR.
- Production Acceptance Notification (PAN) – returned to the IGS from the LP DAAC to announce the status of each submitted PDR. If ingest fails, the PAN will contain a message that describes what errors were encountered.

The protocol for the physical media transfer of metadata and browse data to the LP DAAC comprises these five files:

- Physical Media Product Delivery Record (PMPDR) – accompanies the product from the IGS to the LP DAAC and describes the source, contents, and internal labeling of all metadata and browse products contained on the media.
- Metadata product (MTA) – A product that contains Format 1 and Format 2 metadata for one Landsat 7 subinterval, and includes references to accompanying browse images. Multiple metadata products may be written to one tar file on the media.
- Browse images (R##) – A browse image of each scene described in the metadata products delivered on the media.
- Physical Media PDR Discrepancy (PMPDRD) – returned to the IGS from the LP DAAC only if a problem is found while reading the PMPDR.
- Physical Media Production Acceptance Notification (PMPAN) – returned to the IGS from the LP DAAC to announce status of each submitted PMPDR. If ingest fails, the PMPAN will contain a message that describes what errors were encountered.

Table 5-1 summarizes the products and some of their characteristics.

<b>Product</b>	<b>From/ To</b>	<b>Product Description</b>	<b>Delivery Medium</b>	<b>Delivery Frequency</b>
Metadata	IGS to LP DAAC	Provides information about each ETM+ scene acquired	Electronic (ftp), Physical media	At least once a month
Browse data	IGS to LP DAAC	Reduced volume representation of an image scene used to determine general ground area coverage and spatial relationships	Electronic (ftp), Physical media	At least once a month (optional product)
PDR	IGS to LP DAAC	Describes source, contents, and internal labeling of the metadata and any browse	Electronic (ftp)	Delivered with the metadata and browse
PDR Discrepancy	LP DAAC to IGS	Reports problems found during processing of the PDR	E-mail	As required
PAN	LP DAAC to IGS	Reports processing status for every PDR file submitted to the LP DAAC	E-mail	After ingest processing of each delivery
PMPDR	IGS to LP DAAC	Describes source, contents, and internal labeling of the metadata and browse contained on the media	Physical Media	Delivered with the metadata and browse
PMPDR Discrepancy	LP DAAC to IGS	Reports problems found during processing of the PMPDR	E-mail	As required
PMPAN	LP DAAC to IGS	Reports processing status for each PMPDR file submitted to the DAAC	E-mail	After ingest processing of each delivery

***Table 5-1: Product Descriptions - LP DAAC / IGS.***

## **5.2 Sending Electronic Files to the LP DAAC**

The metadata file(s) and associated Product Delivery Record file(s) are sent to the staging server from the IGS using file transfer protocol (ftp). They are placed in the appropriate IGS input directories. If an IGS chooses to send browse, they are placed in the same directory as the metadata file(s).

### 5.2.1 PDR Formats for Electronic Delivery

If an IGS only sends metadata, the PDR is formatted as follows (Example ONLY, using Brazil's station ID (CUB) and files):

```
ORIGINATING_SYSTEM = IGSCUB;
TOTAL_FILE_COUNT = 1;
OBJECT = FILE_GROUP;
    DATA_TYPE = L7IGS;
    NODE_NAME = <Host name>;
    OBJECT = FILE_SPEC;
        DIRECTORY_ID = /IGS/META/CUB/DATA;
        FILE_ID = L7CUB216062200103110.MTA;
        FILE_TYPE = METADATA0;
        FILE_SIZE = 38027;
    END_OBJECT = FILE_SPEC;
END_OBJECT = FILE_GROUP;
```

If an IGS sends browse and metadata; the PDR is formatted as follows (Example ONLY, using Brazil's station ID (CUB) and files):

```
ORIGINATING_SYSTEM = IGSCUB;
TOTAL_FILE_COUNT = 3;
OBJECT = FILE_GROUP;
    DATA_TYPE = L7IGS;
    NODE_NAME = <Host name>;
    OBJECT = FILE_SPEC;
        DIRECTORY_ID = /IGS/META/CUB/DATA;
        FILE_ID = L7CUB001074200104260.MTA;    ** see note
        FILE_TYPE = METADATA0;
        FILE_SIZE = 15785;
    END_OBJECT = FILE_SPEC;
    OBJECT = FILE_SPEC;
        DIRECTORY_ID = /IGS/META/CUB/DATA;
        FILE_ID = L7CUB00107420010426.R01;    ** see note
        FILE_TYPE = BROWSE;
        FILE_SIZE = 9953;
    END_OBJECT = FILE_SPEC;
    OBJECT = FILE_SPEC;
        DIRECTORY_ID = /IGS/META/CUB/DATA;
        FILE_ID = L7CUB00107420010426.R02;    ** see note
        FILE_TYPE = BROWSE;
        FILE_SIZE = 17583;
    END_OBJECT = FILE_SPEC;
END_OBJECT = FILE_GROUP;
```

**\*\* NOTE:** Fields in the metadata file should reference the same file names as the PDR using the following fields and formats (Example ONLY, using Brazil's station ID (CUB) and files):

```
FILE_NAME = "L7CUB00107420010426.MTA"
BROWSE_FILE_NAME = "L7CUB00107420010426.R01"
BROWSE_FILE_NAME = "L7CUB00107420010426.R02"
```

Please refer to the Landsat 7 to IGS ICD (Reference Document 1) for specific guidelines.

### 5.2.2 File Transfer Instructions

The following are the steps to be followed in sending files to the LP DAAC staging server:

1. Establish an ftp connection to the host using the Host name. If you need to use the IP address, please use 'nslookup <Host name>' to determine the correct address.
2. Once connected, enter your User name and Password
3. Change to the metadata directory specified in section 5.2.3 for your site
4. Use the ftp "put" command to transfer metadata files (and browse) to the LP DAAC
5. Change to the PDR directory specified in section 5.2.3 for your site
6. Use the ftp "put" command to transfer the PDR file(s) to the LP DAAC
7. When you have finished, use the ftp "bye" command to exit from ftp

NOTE: Metadata and browse files need to be delivered before the PDR files. This will ensure the successful initiation of LP DAAC ingest routines.

### 5.2.3 Account and Directory Information

LP DAAC account information will be provided by mail to each IGS through either the MMO or IC Coordinator once the MOU has been signed and the IGS is within 3 months of being operational. The ftp directory structure for each IGS is as follows:

Metadata and browse products: /IGS/META/<ID>/DATA

Product delivery notices: /IGS/META/<ID>/PDR

Refer to Table 3-2 for <ID> codes.

### 5.2.4 Typical "put" ftp Session with the LP DAAC

>ftp <Enter Host name here>

Username: <id>igs

Password: <Enter Password here>

>cd /IGS/META/<ID>/DATA

>put <MTA or browse Filename>

... once transfer of metadata and browse files is complete ...

>cd /IGS/META/<ID>/PDR

>put <PDR Filename>

... once transfer of PDR file(s) is complete ...

>bye

NOTE: Metadata and browse files need to be delivered before the PDR files. This will ensure the successful initiation of LP DAAC ingest routines.

Refer to Table 3-2 for <id> and <ID> codes.

### **5.2.5 LP DAAC Transfer Problem Resolution**

There are several steps that can be taken if you are having problems:

1. Contact your local system administrator if you have any questions about your workstation/PC utilities such as ftp or SSH, or if you have any questions about your security protocols.
2. Use 'nslookup <Host name>' to determine the IP address is needed.
3. If you can connect to the LP DAAC using ftp or SSH, but cannot access the correct directory or cannot "put" your files, contact the LP DAAC using the information provided in Appendix D, and let them know you do not seem to have the correct permissions.
4. If you can not connect to the LP DAAC at all, try using trace route or other options (verbose option), and provide as much detail as possible to the LP DAAC and to your system administrators.

### **5.3 Sending Physical Media to the LP DAAC**

Both metadata and browse files can be mailed to the LP DAAC on 8mm cartridge (tape). The LP DAAC mailing address is listed in Appendix D. Browse images must be accompanied by their associated metadata files. Each set of metadata and browse files should have one corresponding Physical Media Product Delivery Record (PMPDR). Each set of files and their PMPDR should be written to a single TAR file. There should only be one TAR file per tape. Please refer to the Landsat 7 to IGS ICD (Reference Document 1) for specific guidelines and file formats.

In the event that a file check on the tape by the LP DAAC reveals that the PMPDR file is missing, LP DAAC personnel will contact the appropriate IGS operations personnel and request a copy of the PMPDR be sent to the LP DAAC either by fax or attached in an e-mail. The facsimile phone number and e-mail address for the LP DAAC are listed in Appendix D.

If a tape cannot be read at all, the LP DAAC personnel will notify the IGS and pass on to them any available details for use in resolving the problem. The IGS will generate a new tape and mail it to the LP DAAC if necessary.

The information required on the paper label attached externally to the tape includes:

- Name of the PMPDR file
- Creation date
- Unique media ID
- Acquisition date ranges of the files contained on the media

### **5.4 Receiving e-mail Files from the LP DAAC**

Files are sent from the LP DAAC to the IGSs via e-mail. The actual file name of the PDR Discrepancy or PAN file is placed in the subject line of the e-mail message. The body of the e-mail message contains the file as defined in the Landsat 7 to IGS ICD (Reference Document 1).



## 5.5 Appropriate IGS Actions for Reported Dispositions

The files sent by e-mail to the IGS from the LP DAAC report the results of PDR, PMPDR, metadata and browse data file ingest and archival at the LP DAAC. In Table 5-2, the possible disposition messages that could be included in the PDR Discrepancy, PAN, PMPDR Discrepancy, and PMPAN files are listed in alphabetical order along with a brief description of each.

No action should be taken by the IGS until they are contacted by the LP DAAC operator. In almost all cases, the problem will be resolved by the LP DAAC operator and the IGS will receive a second PAN or PMPAN message with the disposition of SUCCESSFUL. If the problem cannot be resolved by the LP DAAC, the operator will contact the IGS to coordinate a resolution.

Reported Disposition	Description
ALL FILE GROUPS/FILES NOT FOUND	Metadata file not available when trying to ftp it; or metadata or browse file not found on tape; or file had a size of 0
DATA ARCHIVE ERROR	Problem during ingest of the metadata or browse files
DATA CONVERSION FAILURE	Error during ingest of the metadata or browse file
DATA PROVIDER REQUEST THRESHOLD EXCEEDED	Not applicable to IGSs
DATA PROVIDER VOLUME THRESHOLD EXCEEDED	Not applicable to IGSs
DATABASE FAILURES	Error in accessing the Ingest database
DUPLICATE FILE NAME IN GRANULE	A metadata or browse file name is a duplicate of an existing file name
ECS INTERNAL ERROR	Error during ingest of the input files
FILE I/O ERROR	Problem during ingest of the input files
FTP/KFTP COMMAND FAILURE	There is a problem with the ftp command; (ignore the reference to KFTP; it is no longer applicable); Not applicable to tape transfer
FTP/KFTP FAILURE	Other ftp errors; (ignore the reference to KFTP; it is no longer applicable); Not applicable to tape transfer
INCORRECT NUMBER OF FILES	There are no input files; or the number of input browse or metadata files is not within the minimum and maximum limits for that type of file
INCORRECT NUMBER OF METADATA FILES	For metadata only submissions, there should be one metadata file for each PDR
INVALID DATA TYPE	The DATA_TYPE parameter is missing from the file group; or the value along with its appropriate Version ID is not in the Ingest database
INVALID DIRECTORY	The DIRECTORY_ID parameter in the PDR is missing or empty for a file; Not applicable to tape transfer, not used in the PMPDR
INVALID FILE COUNT	The TOTAL_FILE_COUNT parameter is either missing or <=0
INVALID FILE ID	The FILE_ID parameter is missing or empty for a file
INVALID FILE SIZE	The FILE_SIZE parameter is missing, empty, or 0 for a file

**Table 5-2: Possible Disposition Messages and Their Meaning. (1 of 2)**

<b>Reported Disposition</b>	<b>Description</b>
INVALID FILE TYPE	The FILE_TYPE parameter is missing or empty for a file; or the value is not in the Ingest database for the given data type
INVALID NODE NAME	The NODE_NAME parameter in the PDR is missing or empty for the file group; Not applicable to tape transfer, not used in the PMPDR
INVALID OR MISSING FILE TYPE	The input file type is not properly entered in the Ingest database
METADATA PREPROCESSING ERROR	Error during ingest of the metadata file
MISSING OR INVALID ORIGINATING_SYSTEM PARAMETER	The ORIGINATING_SYSTEM parameter is missing or empty
NETWORK FAILURE	Ftp service not available; Not applicable to tape transfer
POST-TRANSFER FILE SIZE CHECK FAILURE	Either the FILE_SIZE parameter in the PDR is incorrect or the entire metadata file did not get ftp'd; Either the FILE_SIZE parameter in the PMPDR is incorrect or the entire metadata or browse file did not get written to tape
REQUEST CANCELLED	Request was cancelled by the DAAC operator
RESOURCE ALLOCATION FAILURE	Error during ingest of the metadata file
SUCCESSFUL	Ingest of all files was successful
SYSTEM REQUEST THRESHOLD EXCEEDED	Not applicable to IGSs
SYSTEM VOLUME THRESHOLD EXCEEDED	Not applicable to IGSs
UNABLE TO ESTABLISH FTP/KFTP CONNECTION	Cannot open ftp data connection; (ignore the reference to KFTP; it is no longer applicable); Not applicable to tape transfer

**Table 5-2: Possible Disposition Messages and Their Meaning. (2 of 2)**

## 5.6 Handling of Sensitive Data

Sensitive data related to the interface between the LP DAAC and the IGSs are the IP addresses and IGS passwords. Each station, after signing on to become a Landsat 7 IGS, is sent a private letter containing the sensitive data items required by the IGS to access the staging server for metadata delivery. This sensitive data is sent via a postal service and will not be sent electronically. The address provided by the IGSs in the Station Description message is used to mail this information.

## 5.7 Updating of Passwords for the LP DAAC Server

Each IGS is assigned a password for access to the LP DAAC IGS server. The IGS should change their assigned password as soon as possible upon receipt of the password and IP address. Each IGS should change their password every 6 months to remain in accordance with US Federal security guidelines.

To update or change the password for access to the LP DAAC IGS server, you need Secure Shell (SSH) version 1 or 2.

Free SSH software is available from <http://www.openssh.com/>.

Other Web sites on SSH include the following:

<http://www.ssh.com/>

<http://www.ssh.com/company/sales/store/index.html>

<http://pgpdist.mit.edu/FiSSH/index.html>

For Frequently Asked Questions, refer to:

<http://www.employees.org/~satch/ssh/faq/ssh-faq.html>

*NOTE: EDC is not responsible for the above Web pages or their contents. If you encounter any problems with these sites or the SSH software, please contact the Web administrator for the site or the SSH software provider.*

Once you have acquired SSH software, follow these general instructions:

1. Have SSH installed on the machine from which you are going to access the LP DAAC IGS server.
2. Ensure that your local firewall will permit outgoing SSH connects to port 250 for SSH1 or port 22 for SSH2. Make sure you are using passive mode.
3. Log onto the LP DAAC IGS server using one of the following:  
For SSH version 1, use

```
ssh -l <user_name> -p 250 <Host_name>
```

For SSH version 2, use

```
ssh -l <user_name> -p 22 <Host_name>
```

To make troubleshooting easier, use the verbose option (-v) for debugging. For example, type:

```
ssh -v -l <user_name> -p <port #> <Host_name>
```

where <port #> is = 250 if using SSH version 1 or = 22 if using SSH version 2

4. Use the Unix command "passwd" to set up the new password:

```
(server_name)% passwd
Enter login password:<oldpassword>
Enter new password:<newpassword>
Confirm new password:<newpassword>
Password changed successfully
```

5. Log out of your SSH session by typing exit.

```
(server_name)% exit
```

NOTE: Please work with your system administrators if you encounter any problems. We are providing this information to you as general guidance. Your system may be configured to operate differently.

NOTE: The SSH is only required to be used to change your password. You do not need to use it to transfer files to the LP DAAC server. For file transfers, use ftp "put".

## **Appendix A    Abbreviations and Acronyms**

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ACQ.	Acquisition
alpha	Alphabetic
Bldg.	Building
BME	Brower Mean Element
CCR	Configuration Change Request
cd	Change Directory
DAAC	Distributed Active Archive Center
DCN	Document Change Notice
DTG	Date Time Group
ECS	EOSDIS Core System
EDC	EROS Data Center
EOSDIS	Earth Observing System Data and Information System
EROS	Earth Resources Observation System
ETM+	Enhanced Thematic Mapper Plus
fax	Facsimile
FORMATS	Flight Dynamics Facility Orbital and Mission Aids Transformation System
FOT	Flight Operations Team
ftp, FTP	File Transfer Protocol
GSFC	Goddard Space Flight Center
hrs	Hours
HTSI	Honeywell Technology Solutions Inc.
I/O	Input/Output
IC	International Cooperator
ICD	Interface Control Document
ID, id	Identification
IGS	International Ground Stations
IIRV	Improved Interrange Vector
IP	Internet Protocol

IPM	IGS Priority & Service Request Map Editor
KFTP	Kerberos File Transfer Protocol
L7	Landsat 7
LCG	Landsat Coordinating Group
LGSOWG	Landsat 7 Ground Station Operators Working Group
LP	Land Processes
LS7	Landsat 7
LTWG	Landsat Technical Working Group
MAX.	Maximum
MD	Maryland
mm	millimeter
MMO	Mission Management Office
MOC	Mission Operations Center
MOU	Memorandum of Understanding
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NORAD	North American Air Defense
OA	Operations Agreement
PAN	Production Acceptance Notification
PC	Personal Computer
PDR	Product Delivery Record
PDRD	Product Delivery Record Discrepancy
PMPAN	Physical Media Production Acceptance Notification
PMPDR	Physical Media Product Delivery Record
PMPDRD	Physical Media PDR Discrepancy
PRI	Priority Mask file
PSR	Priority/Service Request Mask file
REQ.	Request
RF	Radio Frequency

Rm.	Room
S/C	Spacecraft
SAIC	Science Applications International Corporation
SD	South Dakota
SSH	Secure Shell
TAR	Tape Archiver
TBD	To Be Determined
TBR	To Be Resolved
TBS	To Be Supplied
US	United States
URL	Uniform Resource Locator
USGS	United States Geological Survey
Z	Zulu time (same as GMT)

## **Appendix B    FOT Points of Contact**

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**For mission scheduling problems, concerns, or questions, contact the following:**

During prime shift (1200Z through 2300Z):

Michele Crizer	Mission Planning Lead
Tim Wilcox	Mission Planner
Sang Lee	Mission Planner
Asma Siddiqui	Mission Planner

Phone	(301) 614-5541 or (301) 614-5203
Fax	(301) 614-5263
E-mail	L7MPT@LISTSERV.GSFC.NASA.GOV
Mail Code	428.1
Address	GSFC/NASA Bldg. 32, Rm. C211 Greenbelt, MD 20771 USA

**In all other cases, contact the Mission Management Office.  
(See Appendix C.)**



## Appendix C    MMO Points of Contact

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Name & Title: Kristi Kline, Mission Management Officer (billing issues)

Phone: 605-594-2585

Fax: 605-594-6567

Pager: N/A

E-mail: [kkline@usgs.gov](mailto:kkline@usgs.gov)

Address: USGS / EROS Data Center  
Mundt Federal Building  
Sioux Falls, SD 57198 USA

Name & Title: Ron Smilek, Flight Systems Manager (requests for night, water, specials)

Phone: 301-614-5158

Fax: 301-614-5263

Cell : 443-618-2975

E-mail: [smilek@usgs.gov](mailto:smilek@usgs.gov)

Address: Landsat 7 Project, Code 428.1  
GSFC  
Greenbelt, MD 20771 USA

Name & Title: Mike Headley, Chief Engineer

Phone: 605-594-2644

Fax: 605-594-6567

Pager: N/A

E-mail: [headley@usgs.gov](mailto:headley@usgs.gov)

Address: USGS / EROS Data Center  
Mundt Federal Building  
Sioux Falls, SD 57198 USA

Name & Title: Steve Covington, IC Coordinator (MOU issues)

Phone: 301-614-5211

Fax: 301-614-5263

Cell : 443-618-2976

E-mail: [steven.covington@gsfc.nasa.gov](mailto:steven.covington@gsfc.nasa.gov)

Address: Landsat 7 Project, Code 428.1  
GSFC  
Greenbelt, MD 20771 USA

## **Appendix D   LP DAAC Points of Contact**

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### **Mailing address for physical media:**

LP DAAC Operations  
U.S. Geological Survey  
Mundt Federal Building  
EDC Operations, Room 1502  
Sioux Falls, SD USA  
57198-0001

Be sure the package is labeled "Computer Data Tapes – Do Not X-Ray"

### **Regarding archiving IGS metadata and browse data at EDC:**

Name & Title: Paula Smit, Landsat 7 Science Data Specialist

Phone: 605-594-2789

Fax: 605-594-2530

Pager: N/A

E-mail: [smit@usgs.gov](mailto:smit@usgs.gov)

Address: USGS / EROS Data Center  
Mundt Federal Building  
Sioux Falls, SD 57198 USA

Alternate: Bhaskar Ramachandran

Phone: 605-594-6110

E-mail: [bhaskar@usgs.gov](mailto:bhaskar@usgs.gov)

### **Regarding queries about using the EOS Data Gateway:**

Name & Title: User Services

Phone: 605-594-6151

Fax: 605-594-6589

Pager: N/A

E-mail: [custserv@edcmail.cr.usgs.gov](mailto:custserv@edcmail.cr.usgs.gov)

Address: USGS / EROS Data Center  
Mundt Federal Building  
Sioux Falls, SD 57198 USA

**In all other cases, contact the Mission Management Office.  
(See Appendix C.)**

## References

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The latest version of the documents listed below were used as references for the development of this OA or can be used for further information. Web page addresses are also included to facilitate easy access to the documents.

### Reference Document 1

USGS/EDC. 430-11-06-009 and L7-ICD-29. Landsat 7 to IGS Interface Control Document.  
Available at: <http://landsat7.usgs.gov/igsdocs.html>

### Reference Document 2

USGS/EDC. IGS Memoranda of Understanding  
Available from the MMO (See Appendix C for MMO contact information).

### Reference Document 3

USGS/EDC. IGS Priority & Service Request Mask Editor (IPM) Tutorial Files:

- Part A - Priorities

- Part B - Requests

- Part C - Messages

- Part D - Geographic Display

- Part E - Manual Submission

Available at: <http://landsat7.usgs.gov/igsdocs.html>